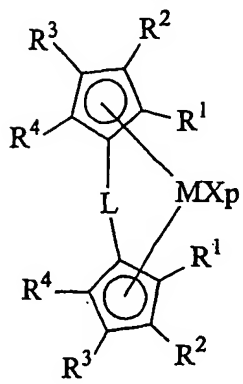
CLAIMS

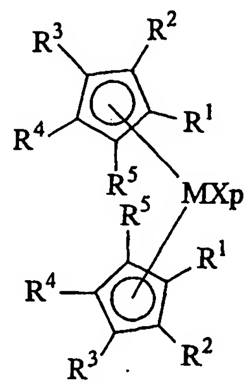
1. A process for the preparation of a porous ethylene polymer comprising:
   (i) prepolymerizing propylene in the presence of a Mg, Ti, and halogen containing solid catalyst component having a porosity, measured by the mercury method set forth in the description, higher than 0.25 cm^3/g up to producing from 0.1 to 15 g of propylene pre-polymer per g of catalyst component; and
   (ii) polymerizing ethylene in the presence of the propylene pre-polymer obtained in step (i) up to an amount of ethylene polymer ranging from 10g to 2.5 kg per g of propylene pre-polymer.
2. The process according to claim 1 in which step (i) is carried out under conditions such that the amount of propylene pre-polymer produced is from 0.3 to 10 g per g of catalyst component
3. The process according to claim 1 in which in step (ii) the amount of ethylene polymer is less than 1 kg per g of propylene pre-polymer.
4. The process according to claim 1 in which the catalyst component used in step (i) comprises a titanium compound supported on a magnesium dihalide.
5. The process according to claim 1 in which the solid catalyst component has a porosity referred to pores having radius up to 1μ, and measured by the mercury method set forth in the description, higher than 0.3 cm^3/g.
6. The process according to claim 1 in which the catalyst component used in step (i) is non-stereospecific.
7. An ethylene polymer having a total porosity due to pores with radius up to $10\mu m$, determined with the method set forth in the description, expressed as percentage of voids, higher than 40%.
8. The ethylene polymer of claim 7 having a porosity higher than 50%.
9. The ethylene polymer of claim 8 in which because the fraction of porosity due to pores with radius up to $1\mu m$ ranges from 25 to 70% of the total porosity due to pores with radius up to 10 μm.
10. A catalyst system comprising:
    (a) an ethylene polymer having porosity expressed as percentage of voids, higher than 40% cm^3/g;
    (b) at least one transition metal organometallic compound; and

(c) an alumoxane or a compound able to form an alkylmetallocene cation.

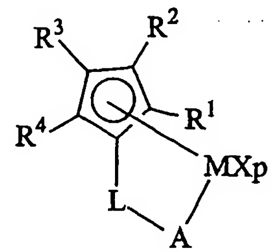
11. The catalyst according to claim 10 wherein transition metal organometallic compounds are metallocene compounds belonging to the following formulas (I), (II) and (III):



(I)



(II)



(III)

wherein

M is a transition metal belonging to group 4, 5 or to the lanthanide or actinide groups of the Periodic Table of the Elements;

the substituents X, equal to or different from each other, are monoanionic sigma ligands selected from the group consisting of hydrogen, halogen, R^6, OR^6, $OCOR^6$, SR^6, NR^6_2 and PR^6_2, wherein R^6 is a linear or branched, saturated or unsaturated C_1-C_{20} alkyl, C_3-C_{20} cycloalkyl, C_6-C_{20} aryl, C_7-C_{20} alkylaryl or C_7-C_{20} arylalkyl group, optionally containing one or more Si or Ge atoms;

p is an integer equal to the oxidation state of the metal M minus 2;

L is a divalent bridging group selected from C_1-C_{20} alkylidene, C_3-C_{20} cycloalkylidene, C_6-C_{20} arylidene, C_7-C_{20} alkylarylidene, or C_7-C_{20} arylalkylidene radicals optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements, and silylidene radical containing up to 5 silicon atoms;

R^1, R^2, R^3, R^4 and R^5, equal to or different from each other, are hydrogen atoms, halogen atoms or linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl, or C_7-C_{20}-arylalkyl radicals, optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; or two adjacent R^1, R^2, R^3, R^4 and R^5 form one or more 3-7 membered ring optional containing heteroatoms belonging to groups 13-17 of the periodic table.